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(54) Title: CONDUCTIVE RESIN COMPOSITION, BASE FOR PHOTOSENSITIVE DRUM USING THE COMPOSITION, AND PHOTOSENSITIVE DRUM

(54) 発明の名称: 導電性樹脂組成物、及びこれを用いた感光ドラム用基体並びに感光ドラム

(57) Abstract: A conductive thermoplastic resin composition to which a conductive agent is added, characterized in that a base resin contains a polyester resin. The coefficient of water absorption of the conductive resin composition which is measured in conformity with ASTM D-570 when the composition is left for 24 hours in an environment of the temperature of 50°C and the relative humidity of 90% is preferably below 1.0%. The conductive resin composition easily enables weight reduction without degrading mechanical strength, workability, etc. and has high dimensional stability even under a service condition of high temperature and high humidity. The composition is suitably used for a base for a photosensitive drum, and the photosensitive drum.

(57) 要約: 導電剤が添加された熱可塑性の導電性樹脂組成物において、ベース樹脂がポリエステル系樹脂を含むことを特徴とする導電性樹脂組成物である。この導電性樹脂組成物は、好ましくは、温度50℃、相対湿度90%の環境下で24時間放置した際の吸水率として、ASTM D-570に準拠して測定された値が1.0%未満である。本発明により、機械的強度、加工性などの低下を招くことなく、軽量化を容易に達成することができると共に、特に高温高湿の使用条件においても高い寸法安定性を有する導電性樹脂組成物を提供することができる。この組成物は、感光ドラム用基体や感光ドラムに好適に使用される。

04/060998

### 明細書

導電性樹脂組成物、及びこれを用いた感光ドラム用基体並びに 感光ドラム

### 背景技術

本発明は、導電性樹脂組成物、及びこれを用いた感光ドラム用基体並びに感光ドラムに関する。さらに詳しくは、本発明は、成形加工が容易で、かつ寸法安定性に優れた導電性樹脂組成物、及びこれを用いた感光ドラム用基体、並びに該基体を用いてなる感光ドラムに関するものである。

一般に、複写機、ファクシミリ、プリンターなどの電子写真装置や静電記録装置などにおける静電記録プロセスにおいては、まず、光導電性物質〔例えばZnO、CdS、Se、OPC(有機半導体)、アモルファスシリコン(a-Si)など〕層を有する感光ドラム表面を一様に帯電させ、該感光ドラム表面に光学系から映像を投射し光の当たった部分の帯電を消去することによって静電潜像を形成し、次いで、この静電潜像にトナーを供給してトナーの静電的付着によりトナー像を形成し、最後にこれを紙、OHP用紙、印画紙等の記録媒体へ転写して画像を形成する方法が採られている。

従来、このような静電記録プロセスに用いられる感光ドラムの基体としては、比較的軽量で機械加工性にも優れ、かつ良好な導電性を有することから、アルミニウム合金を円筒状や円柱状に加工したものが用いられていた。しかし、近年、生産性、リサイクル性の改良の要求が高まるにつれ、このアルミニウム合金製基体に代わるものとして、例えばべー

ス樹脂としてポリアミド系樹脂などの熱可塑性樹脂を用い、これにカーボンブラックなどの導電剤を混合分散した導電性樹脂組成物を射出成形してなる樹脂製基体を用いることも行われている。この樹脂製基体は、フランジやギアなどの付属品も基体本体と共に一体成形することができる、低振動・低騒音である、電荷のリークが小さい、電位の減衰特性が緩やかである、リサイクル性が向上する、などの長所を有している。

ここで、上記感光ドラムには、その機能から、内外径精度、真直度、 真円度などの高い寸法精度が要求され、幅広い温度範囲又は幅広い湿度 範囲のあらゆる使用条件下において性能が維持される必要があるが、現 在では、特に高温高湿の使用環境において寸法精度が低下しやすく、十 分満足できるものを得るのが困難であるのが実状である。

### 発明の開示

本発明者らは、このような状況下で、従来における諸問題を解決し、機械的強度の低下や、加工性の低下などを招くことなく、特に高温高湿の使用条件においても高い寸法安定性を有する導電性樹脂組成物、及びこれを用いた感光ドラム用基体、並びに該基体を用いた感光ドラムを提供することを目的とするものである。

本発明者らは、前記の優れた機能を有する感光ドラム用基体及び感光ドラムに適用する樹脂組成物の開発に関し鋭意研究を重ねた結果、ベース樹脂にポリエステル系樹脂を用いることにより、その目的を達成し得ることを見出した。本発明は、かかる知見に基づいて完成したものである。

すなわち本発明は、導電剤が添加された熱可塑性の導電性樹脂組成物 において、ベース樹脂がポリエステル系樹脂を含むことを特徴とする導

電性樹脂組成物を提供するものである。

また本発明は、電子写真プロセスなどの静電記録プロセスに用いられる感光ドラム用樹脂製基体であって、該基体が上記の導電性樹脂組成物からなることを特徴とする感光ドラム用基体を提供するものである。

さらに、本発明は、前記感光ドラム用基体上に感光層を有することを 特徴とする感光ドラムをも提供するものである。

### 発明を実施するための最良の形態

本発明の導電性樹脂組成物においては、ベース樹脂がポリエステル系 樹脂を含むことが必要である。このような導電性樹脂組成物を感光ドラ ムの基体に適用した場合には、該基体製品の寸法変化を小さく抑え、高 い寸法精度を維持することができる。

本発明の感光ドラム用基体は、公知の方法、例えば導電性樹脂組成物を、射出成形法や押出し成形法により、所定の円筒形状や円柱形状に成形することにより作製することができ、中でも射出成形法が特に好ましい。

前記ポリエステル系樹脂としては、芳香族系のジカルボン酸と脂肪族系アミンとの反応によって得られるものが好ましく、具体的にはポリブチレンテレフタレート(PBT),ポリエチレンテレフタレート(PET),ポリエチレンナフタレート(PEN),ポリプロピレンテレフタレート(PPT)などが挙げられる。この中でもポリブチレンテレフタレート、ポリエチレンテレフタレートあるいはポリエチレンナフタレートが好ましい。

また、ベースとなるポリエステル系樹脂以外に、衝撃強度改良や流動性、加工性などの改良を目的として適宜、他の樹脂や添加剤、滑剤等を

配合することができる。

ここで、他の樹脂としては、特に制限はないが、成形性の向上や低コスト性の点からは、ナイロン6やナイロン66などのポリアミド系樹脂を配合することが好ましい。また、低吸湿性樹脂として、例えばポリプロピレン、ポリフェニレンエーテル、ポリフェニレンサルファイド等を配合することもできる。

また、添加剤としては、ポリエステル系エラストマー (例えばポリエステルーポリエーテル共重合体),ポリオレフィン系エラストマー (例えばエチレンープロピレン三元共重合体)などの各種エラストマー、ステアリン酸ナトリウム、モンタン酸ナトリウムなどの金属石鹸、ステアリン酸アミド,アルキル系ビスアミドなどのアミド系滑剤等を用いることができる。上記各種エラストマーは衝撃改良剤としての効果を有し、上記金属石鹸、アミド系滑剤等は流動性・加工性の改良剤としての効果を有する。

これら他の樹脂や添加剤はその配合量が多くなると、得られる導電性 樹脂組成物の吸水性、耐薬品性、曲げ弾性率、衝撃強度等の機械特性が 低下する傾向にあるので、ポリエステル樹脂100重量部に対して、他 の樹脂の場合は100重量部以下、特に30重量部以下の範囲の配合が 好ましく、流動性・加工性の改良剤の場合は50重量部以下、特に20 重量部以下の範囲の配合が好ましい。

本発明の導電性樹脂組成物において用いられる導電剤としては、前記樹脂成分に均一に分散可能であればよく特に制限されず、例えば、カーボンブラック、グラファイト、さらにはアルミニウム、銅、ニッケル等の金属粉、導電性ガラス粉等が挙げられるが、中でもカーボンブラックが好ましい。この導電剤の配合量としては、樹脂分100重量部に対し

て、好ましくは5~40重量部、さらに好ましくは20~35重量部の 範囲で選定される。導電剤が多くなると衝撃強度などの機械特性が低下 する傾向があり、少なくなると所望の導電性の十分な発現が困難になる 場合がある。

また、本発明の導電性樹脂組成物には、所望により、各種繊維やウィスカ等の充填材を含有することができる。該充填材としては、例えば、カーボン繊維、導電性ウィスカ、導電性ガラス繊維等の導電性の充填材、ガラス繊維等の非導電性の充填材などが挙げられる。

特に、弾性率や強度の向上を重視する観点からは、繊維状のケイ酸カルシウム、チタン酸カリウムや、炭化ケイ素、窒化ケイ素、酸化マグネシウム、チタン酸カリウム、水酸化アルミニウム等の通常のウィスカ繊維を用いることができる。その中でもケイ酸カルシウムの繊維状フィラーとりわけウィスカが好ましい。ここで、繊維状フィラーとしてのケイ酸カルシウムは、例えば「ワラストナイト」として入手することができる。このワラストナイトは、天然鉱物であるケイ灰石を粉砕・精製したものであり、平均径が6~25μmの微細な繊維状の白色粉末である。

また、上記のうち無機充填材を用いる場合は、例えばアミノシラン、 エポキシシラン、ウレイドシラン、ビニルシランなどのシラン系カップ リング剤やチタネート系カップリング剤を配合することにより、あるい は予め無機充填材をこのようなカップリング材で表面処理することに より樹脂との親和性を高めて使用することもできる。

上記の充填材の配合量としては、特に制限はなく、充填材の種類、繊維の長さ及び径等に応じて適宜選択されるが、樹脂成分100重量部に対して、好ましくは10~50重量部、さらに好ましくは25~45重量部の範囲で選定される。充填材が多くなると衝撃強度などの機械特性

が低下する傾向があり、少なくなると曲げ強度・曲げ弾性率などの機械 特性が低下する傾向にある。

その他の添加剤としては、ポリテトラフルオロエチレン (PTFE)、シリコーン樹脂、二硫化モリブデン ( $MoS_2$ )、各種金属石鹸などを挙げることができる。

本発明における導電性樹脂組成物は、温度 50  $\mathbb{C}$ 、相対湿度 90 %の環境下で 24 時間放置した際の吸水率として、ASTM D-570 に準拠して測定した吸水率が 1.0 %未満であることが好ましく、さらに 0.5 %以下、特に 0.2 %以下であることが好ましい。

次に、本発明の感光ドラム用基体の形状としては、回転により、容易に記録媒体に画像を形成し得る点で、円筒状や円柱状等が好ましい。該基体の成形方法としては、特に制限はなく、前述のように、射出成形法、押出成形法等が挙げられ、中でも射出成形法が特に好ましい。成形温度や射出圧力等の成形条件は、基体を構成する樹脂成分の種類等に応じて適宜選択される。

本発明の感光ドラム用樹脂製基体の外周面の物性は、特に制限されるものではないが、その表面粗さを中心線平均粗さRaで $0.8\mu$ m以下、特に $0.2\mu$ m以下、最大高さRmaxで $1.6\mu$ m以下、特に $0.8\mu$ m以下、10点平均粗さRzで $1.6\mu$ m以下、特に $0.8\mu$ m以下とすることが好ましい。これらRa,Rmax,Rzが大きくなると、樹脂製基体表面の凹凸が、感光ドラムの感光層上に現れて、これが画像不良の原因となる場合がある。

本発明の感光ドラムは、高速画像形成装置に装着されるものであって、 前記本発明の感光ドラム用樹脂製基体上に、感光層及び必要に応じその 他の層、例えば下引き層や保護層などを有するものである。前記感光層

としては、少なくとも電荷発生層及び電荷輸送層を有するものが好ましい。ここで、電荷発生層は、例えば電荷発生化合物及び結着樹脂で構成することができる。前記電荷発生化合物としては、特に制限はなく、従来、感光体の電荷発生層に用いられる公知の化合物の中から適宜選択され、各種無機系導電性化合物、有機系導電性化合物等が挙げられる。これらの中でも、電荷発生能の高い化合物等が好ましい。また、結着樹脂としては、特に制限はなく、従来、感光体の電荷発生層等に用いられる公知の樹脂の中から適宜選択される。この電荷発生層は、公知の塗布、蒸着等の方法によって形成することができる。

一方、電荷輸送層は、不均一電荷輸送層及び均一電荷輸送層を有する ものが好ましく、前記不均一電荷輸送層としては、特に制限はないが、 粒子分散型不均一電荷輸送層や、相分離型不均一電荷輸送層等が好まし い。該不均一電荷輸送層は、高分子材料等の、前記不均一電荷輸送層に 含有させる材料を、溶剤に分散させ、公知の塗布等の方法によって形成 することができる。

前記均一電荷輸送層としては、特に制限はないが、電荷輸送能が高く、 成膜性に優れる高分子化合物を含有するものが好ましい。該均一電荷輸 送層は、前記高分子材料等の、前記均一電荷輸送層に含有させる材料を、 溶剤に分散させ、公知の塗布等の方法によって形成することができる。 次に、本発明を実施例により、さらに詳細に説明するが、本発明は、

なお、樹脂組成物の吸水率と感光ドラム用基体の外形変化率は、以下 に示す方法に従って求めた。

これらの例によってなんら限定されるものではない。

### 〈吸水率〉

試料を、温度50℃、相対湿度90%の環境下で24時間放置し、そ

の際の吸水率をASTM D-570に準拠して測定した。<ドラム基体の外径変動>

下記により製造した各ドラム基体の端部の外径(A)を測定すると共に、これを50℃、相対湿度90%の環境下で24時間放置後の外径(B)を再測定して、放置前後における外径の変動量[(B)-(A)]を(A)で除した値を%表示した。

実施例1~3、比較例1~3

ベース樹脂として、ポリエステル系樹脂(実施例)又はポリアミド系樹脂(比較例)を用い、第1表の配合組成により、二軸スクリュー押出機を用いて、導電性樹脂組成物をそれぞれ調製し、前記方法により吸水率(%)を測定した。結果を第1表に示す。

また、各導電性樹脂組成物を用いて外径30mm、長さ260mm、 周壁の厚さ1.7mmのドラム基体を射出成形法により成形し、前記方 法により高温高湿下(50℃、相対湿度90%)でのドラム基体の外径 変化率(%)を測定した。結果を第1表に示す。

第1表

	導電性樹脂組成物の配合組成						特 性	
•		樹脂	(重量部)		導電剤 (重量部)	補強材 (重量部)	吸水率 (%)	ドラム基体の 外径変化率
	PA66	PBT	PET	PEN	カーホ゛ンフ゛ラック	ワラストナイト	ASTM D-570	(%)
吸水率(%) ASTM D-570	1.8	0.08	0.06	0.03	-			
比較例 1	100				30	35	1.0	0.4
比較例 2	100	_	_	_	30	25	1.4	0.6
比較例 3	100		-	_	20	35	1.2	0.5
実施例 1	_	100	_	-	30	35	0.2	0.04
実施例 2	-	_	100	_	30	35	0.18	0.03
実施例 3	_			100	30	35	0.14	0.02

注:

PA66:ナイロン66[宇部興産(株)製,商標「UBEナイロン」] PBT:ポリブチレンテレフタレート[ウインテックポリマー(株)

#### 製、商標「テイジンPBT」〕

PET:ポリエチレンテレフタレート〔三菱レイヨン(株)製,商標「ダイヤナイト」〕

PEN:ポリエチレンナフタレート [テイジン (株) 製, 商標「PE N樹脂」]

カーボンブラック:ファーネスカーボンブラック [旭カーボン (株) 製,商標「旭AX-015]

ワラストナイト: [川鉄鉱業(株)製,商標「ウォラストナイト」] 第1表の結果から、ポリエステル系樹脂を用いた実施例1~3の場合は、ポリアミド系樹脂を用いた比較例1~3の場合と比較し、導電性樹脂組成物の吸水率は著しく小さく、また、感光ドラム用基体としての外径変化率は、比較例のものより1/10以下と優れており、いずれも高温高湿条件下においても寸法精度に極めて優れたものであることが分かる。

#### 産業上の利用可能性

本発明によれば、寸法安定性に優れた導電性樹脂組成物を得ることができ、このため、機械的強度、加工性、寸法精度などの低下を招くことなく、軽量化を容易に達成することができると共に、特に高温高湿の使用条件でも優れた寸法精度を維持できる感光ドラム用基体を確実に得ることができる。また、該基体を感光ドラムに適用することにより、画像不良の発生を抑制することが可能となる。

### 請求の範囲

1. 導電剤が添加された熱可塑性の導電性樹脂組成物において、ベース樹脂がポリエステル系樹脂を含むことを特徴とする導電性樹脂組成物。

- 2. 前記導電性樹脂組成物は、温度50℃、相対湿度90%の環境下で24時間放置した際の吸水率として、ASTM D-570に準拠して測定された値が1.0%未満である請求項1に記載の導電性樹脂組成物。
- 3. ポリエステル系樹脂が、ポリブチレンテレフタレート、ポリエチレンテレフタレートあるいはポリエチレンナフタレートである請求項1 又は2に記載の導電性樹脂組成物。
- 4. さらに充填材を含む請求項1ないし3のいずれかに記載の導電性樹脂組成物。
- 5. 充填材の配合量が、樹脂分100重量部に対し10~50重量部である請求項4に記載の導電性樹脂組成物。
- 6. 充填材が、繊維状ケイ酸カルシウムである請求項4又は5に記載の 導電性樹脂組成物。
- 7. 静電記録プロセスに用いられる感光ドラム用樹脂製基体であって、 前記基体が請求項1ないし6のいずれかに記載の導電性樹脂組成物か らなることを特徴とする感光ドラム用基体。

8. 請求項7に記載の感光ドラム用基体上に感光層を有することを特徴とする感光ドラム。

## INTERNATIONAL SEARCH REPORT

International application No.

cited to establish the publication date of another citation or other special reason (as specified)  document referring to an oral disclosure, use, exhibition or other means  "P" document published prior to the international filing date but later than the priority date claimed  Date of the actual completion of the international search  12 February, 2003 (12.02.03)  Name and mailing address of the ISA/  Japanese Patent Office  step when the document is taken alone document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family  Date of mailing of the international search report 25 February, 2003 (25.02.03)  Authorized officer  Telephone No.		J.	PCT/JI	202/13646	
According to International Patent Classification (IPC) or to both national classification and IPC  B. FIELDS SEARCHED  Minimum documentation searched (classification system followed by classification symbols)  Int.el? C08167/00-67/02  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1994-2003  Ackai Jitsuyo Shinan Koho 1971-2003  Jitsuyo Shinan Toroku Koho 1994-2003  Kokai Jitsuyo Shinan Koho 1971-2003  Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  C. DOCUMENTS CONSIDERED TO BE RELEVANT  Category*  Citation of document, with indication, where appropriate, of the relevant passages  X	A. CLASSIFICATION OF SUBJECT MATTER				
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  Jitsuyo Shinan Koho 1926–2003 Toroku Jitsuyo Shinan Koho 1994–2003 Kokai Jitsuyo Shinan Koho 1971–2003 Jitsuyo Shinan Toroku Koho 1996–2003 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  C. DOCUMENTS CONSIDERED TO BE RELEVANT  Category* Citation of document, with indication, where appropriate, of the relevant passages  X JP 6–340799 A (Teijin Ltd.), A 13 December, 1994 (13.12.94), Column 1, lines 2 to 16; column 3, lines 2 to 6  (Family: none)  See patent family annex.  """  See patent family annex.  """  See patent family annex.  """  Interface of the relevant passages  Relevant to claim No.  1, 3–8  2  See patent family annex.  """  See patent family annex.  ""  See patent family annex.  """  See patent family an	The C17 COST 67 (00 67 (00)	wed by classification symbol	ls)		
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Japanese Patent Office  Facsimile No.  Telephone No.	· · · · · · · · · · · · · · · · · · ·		,, 2003 (2	J. UZ. U3)	
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日本国宝用新	「条公報 1926-2003年		
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日本国登録実	知新案公報 1994-2003年		
日本国実用新	案登録公報 1996-2003年		
国際調査で使用	用した電子データベース (データベースの名称)	、調査に使用した用語)	
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	国特許庁(ISA/JP)	神田川 御宝目(植成のある城員)   神田     神田     神田   神田   神田   神田   神田	4J 9268
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